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*TOPEX/POSEIDON PROJECT SATELLITE/SENSORS  
PERFORMANCE CHARACTERISTICS WORKSHOP #11*

*TOPEX ORBIT TRANSFER MANEUVER (TOTM) DESIGN  
AND OPERATION STATUS*

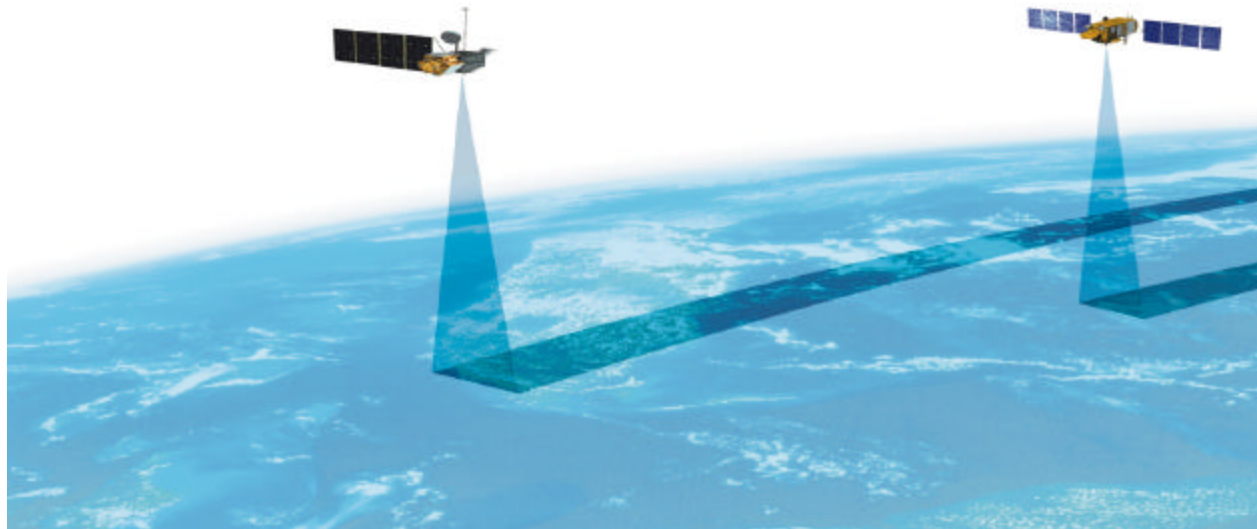
**Lisa Ling**

**NAV/PVT**

**August 20, 2002**



- A shift of  $1.42^\circ$  (157.8 km) west of current track, to be approximately midway between 2 adjacent Jason ground tracks.
- Orbit transfer completion in ~30 days.
- Raise Topex semi-major axis (sma) by 1 km with posigrade burns to begin drift, then lower sma by same amount with retrograde burns to stop drift.
- Achieve nearly frozen status in final orbit per science requirement.
- Topex will lag behind Jason by almost 7 min in equator crossing.



*Topex/Poseidon Satellite/Sensors Performance Workshop #11*

*TOTM Design and Operation Status*



**Baseline TOTM Design**



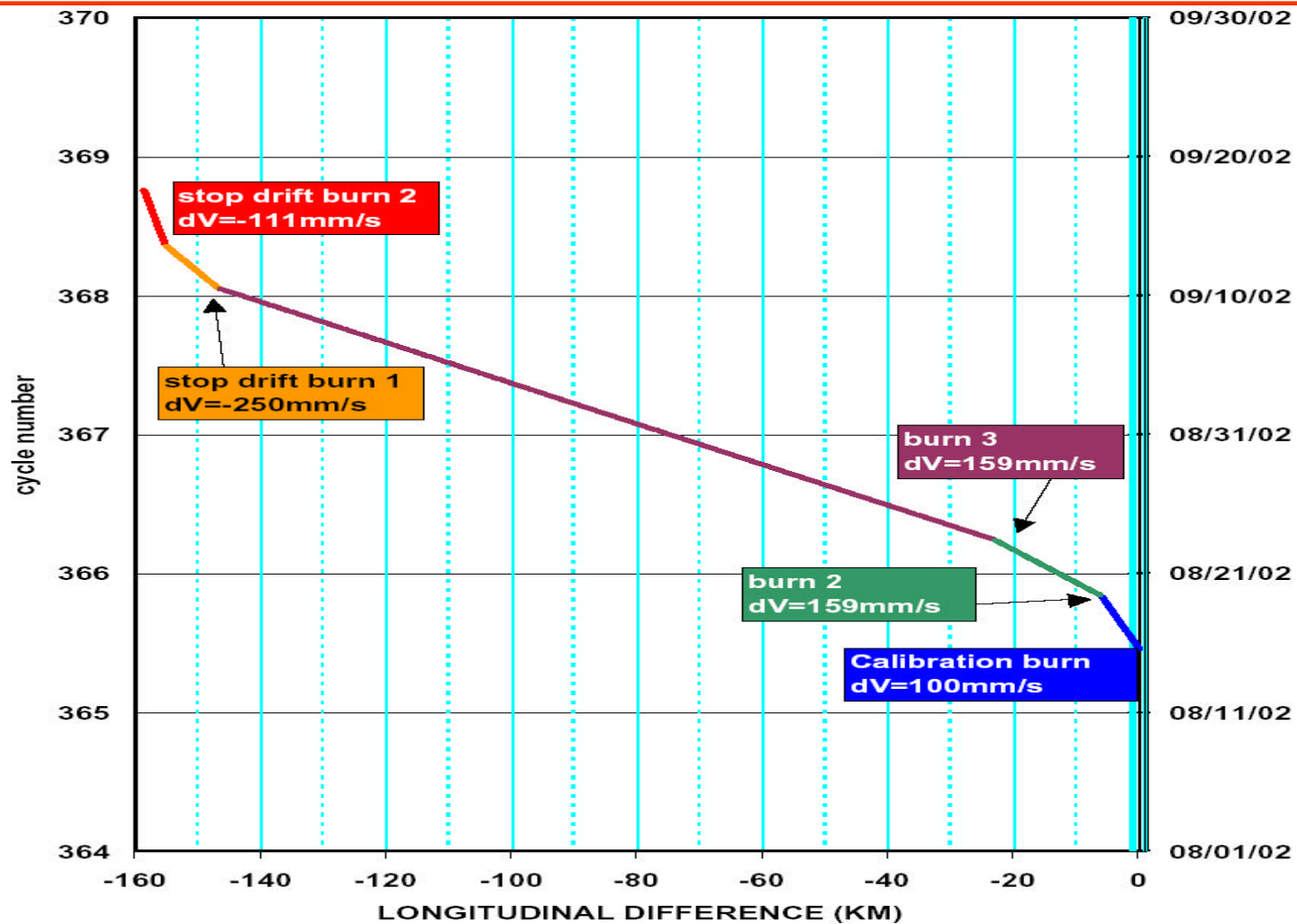
- **Burn separation of 4-4-18-0-3-3 days, starting on 15-Aug-02**
- **Total  $\Delta v$  = 0.84 m/sec**
- **4 days for contingency maneuver following last burn**

Burn	Date	$\Delta v$ (m/sec)	Coast (days)	Total coast (days)	Drift rate (km/day)	Drift (km)	Total drift (km)
1	8/15	0.1	4	4	1.62	6.480	6.48
2	8/19	0.159	4	8	4.20	16.798	23.28
3	8/23	0.159	18	26	6.78	122.023	145.30
4a	9/10	-0.125	0	26	4.75	0.742	146.04
4b	9/10	-0.125	3	29	2.73	8.180	154.22
5	9/13	-0.095	3	32	1.19	3.563	157.79
6	9/16	-0.0734	4	36	0.00	0.000	157.79

# Topex/Poseidon Satellite/Sensors Performance Workshop #11

## TOTM Design and Operation Status

### Predicted Ground Track

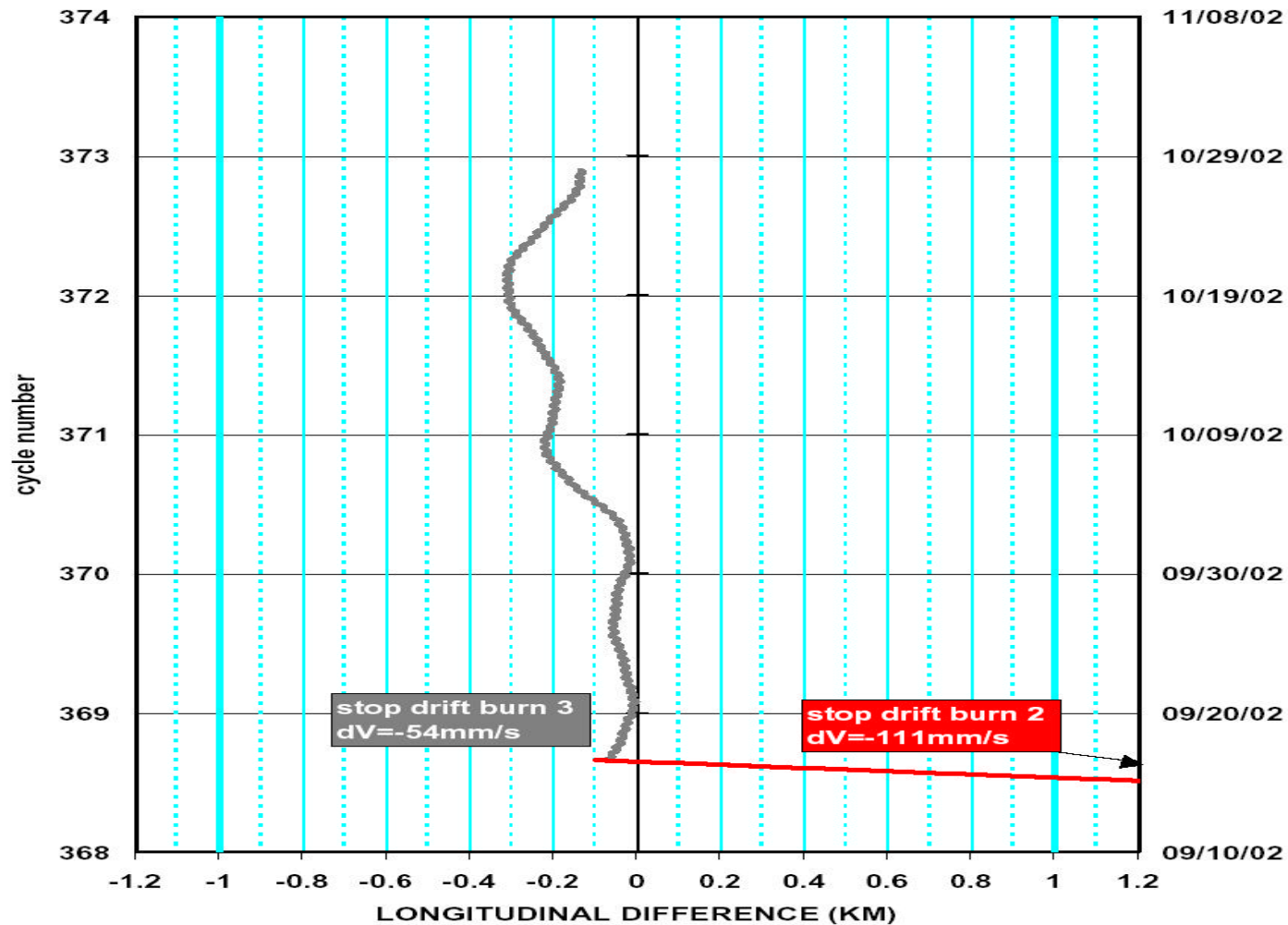


# Topex/Poseidon Satellite/Sensors Performance Workshop #11

## TOTM Design and Operation Status

### Predicted Ground Track

(Based on New Reference Longitude)

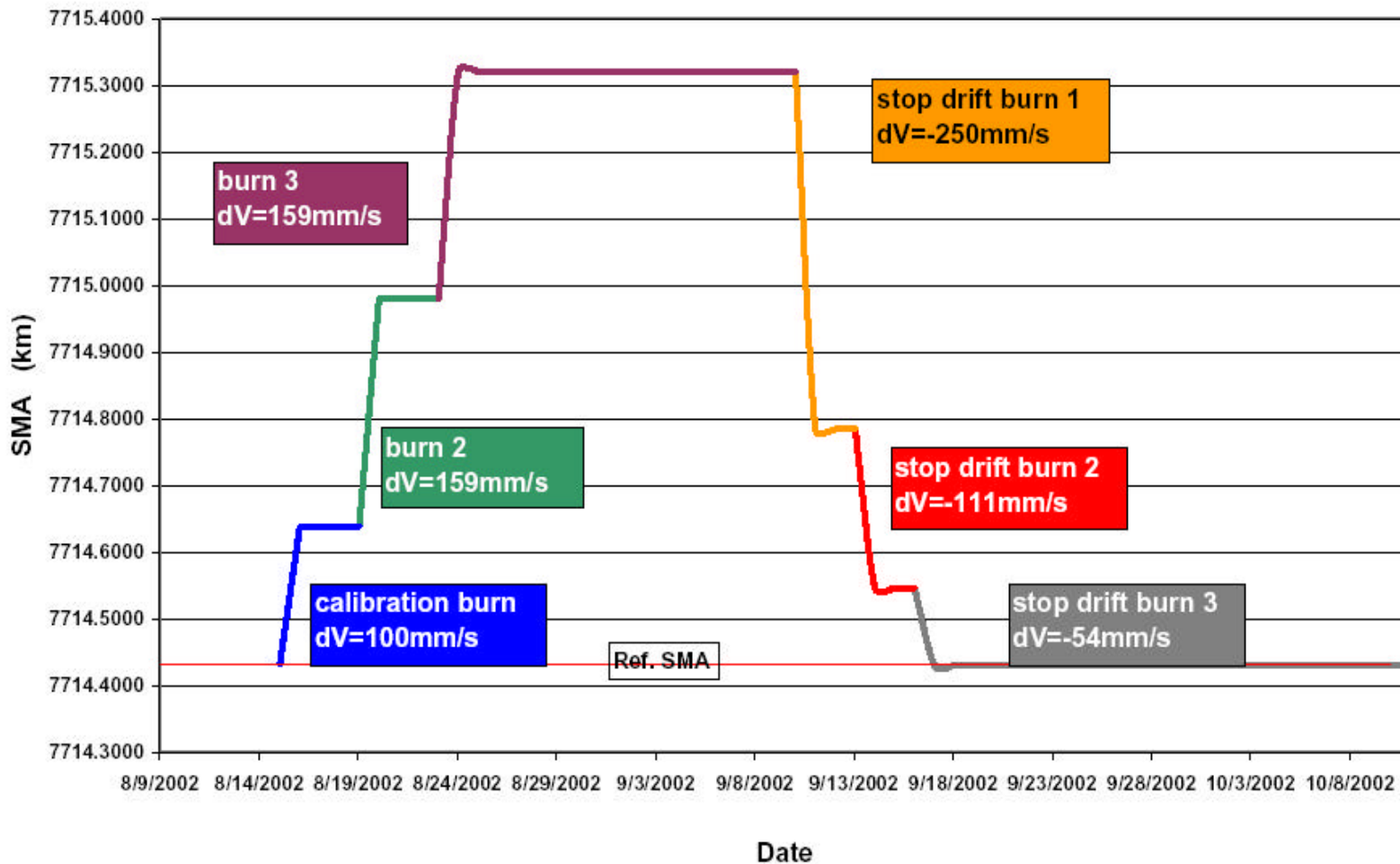


# Topex/Poseidon Satellite/Sensors Performance Workshop #11

## TOTM Design and Operation Status



## Semi-Major Axis Prediction





## **Conclusions**



- **Orbit transfer maneuver sequence:**
  - **Baseline design with a max  $Dv$  of 0.159 m/sec.**
  - **Additional burn sequence designs with max  $Dv$  constraints of 0.15 and 0.1 m/sec are available.**
- **$Dv$  errors will be compensated for by tweaking and optimizing subsequent burns, based on the ground track spacing and drift rate provided by NAVT (mean elements), FDF (EPV), and MOE (GPS and/or SLR) solutions.**
- **To achieve frozen orbit, burn centroid times for all the retro burns will be optimized and set by NAVT.**

***Topex/Poseidon Satellite/Sensors Performance Workshop #11***

***TOTM Design and Operation Status***

***Current Operation Status***



Maneuver	Burn Centroid Time (UTC)	Commanded Dv (mm/s)	Achieved Dv (mm/s)		
			NAVT	FDF	MOE
Calibration Burn	15-Aug-02 19:10:59	100.0	101.64 (89 hr)	101.34 (89 hr)	101.39 (GPS+SLR / 30 hr)
Second Posigrade	19-Aug-02 18:49:27	159.0	162.9 (19 hr)	162.6 (19 hr)	161.35 (GPS / 6.1 hr)